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Remarks:

Sections 1 and 9 contained in the *Construction Manual* have been revised. Please remove and replace the outdated material with the revised as described below. Changes are effective upon receipt.

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Instructions:
Page numbers and corresponding sheet-counts are given in the table below to indicate portions of the *Construction Manual* that are to be removed and inserted to accomplish this revision.

Chapter	Remove		Insert	
	Pages	Sheets	Pages	Sheets
Chapter 1 Administration	73-74	1	73-74	1
Chapter 9 Materials	47-52	3	47-52	3

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1-5.2 Construction Surveying

1-5.2A Surveying Provided by the State

Unless the contract states otherwise, the Project Engineer is responsible for providing all surveying needed to locate and define the contract work. The staking done in construction surveying must assure that the work will conform to the plans and must also conform to the Contractor's approach to the work. There are numerous survey techniques that will accomplish these objectives. Prior to each phase of the work, the Project Engineer must reach agreement with the Contractor concerning the method, location, and timing of construction staking. Once this agreement is reached, it must be shared with all WSDOT, Contractor, and subcontractor personnel who place or use construction stakes.

1-5.2B Contractor Surveying

If the contract requires the Contractor to provide some or all of the construction surveying, the Project Engineer is required to provide only the primary control points staked, marked, and verified in the field and the coordinate information for the main alignment points in the plans. The plan alignment and the field control points must be referenced to the same grid coordinate system.

The provisions for contractor surveying are intended to provide the stakes needed to inspect the work, as well as the primary function of locating and defining the work. If the survey stakes required by the contract do not provide the reference data needed for inspection, then the Project Engineer will have to provide additional survey work that is needed. As an alternative, a change could be negotiated with the Contractor to perform the added work.

The Contractor's survey work is a contract item, just like all other contract items. It must be inspected for adequacy and conformance with the contract. Once it is performed and inspected, it must be paid for.

The wise Project Engineer will inspect the survey efforts and check as much of the contractor's work as is practical. Any errors should be brought to the Contractor's attention for corrective action. The inclusion of contractor surveying in a project transfers the risk of survey errors to the Contractor. The Project Engineer must assure that the survey work of the Contracting Agency does not relieve the Contractor of that risk.

1-6 Inspection of Course Thicknesses

Tabulated below are the permissible deviations in measured thickness for specified depths of surfacing and paving. While these are the maximum deviations that can be allowed, the Project Engineer may impose tighter requirements for conforming to the plan dimensions where there is a reason to do so.

English

Material	Specified Depth	Max. Allowable Deviation at Any One Point	Average Depth Deviation for Entire Project
Untreated Surfacing	0 – 0.25′	-0.05′	-0.025′
and ATB	0.26 – 0.50′	-0.06′	-0.03′
	0.51 – 0.75′	-0.07′	-0.035′
	0.76 – 1.0′	-.08′	-0.04′
	Over 1.0′	-8%	-4%
Asphalt Concrete			
(single-lift)	0.08 – 0.15′	-0.045′	-0.015′
(multi-lift)	0.00 – 0.25′	-0.03′	-0.01′
	0.26 – 0.50′	-0.045′	-0.015′
	0.51 – 0.75′	-0.06′	-0.02′
	Over 0.75′	-0.075′	-0.025′

For asphalt concrete overlays with a specified depth of less than 0.08 foot, it will be the responsibility of the Project Engineer to ascertain the adequacy of the overlay depth in conformance to the plan.

contacted, the testing equipment observed, and the suggestions or on-the-spot corrections that were left with job personnel. Observations other than test performance related to checklists are not normally considered in the evaluation of the individual tester, but may require action by management involved.

At the time of the Independent Assurance Inspection, where samples are required, the IAI will observe the initial sampling and participate in the sample splitting activity to ensure that an accurate split is obtained. The field split will then be tested, under observation. The split portion will be returned to the Regional Materials Laboratory and tested for comparison of results.

Additional separate comparison samples may be split by the field tester and forwarded to the Regional Materials Laboratory as initiated by the field tester or when directed by the IAI as follow up for observed deficient performance. This sample will be carefully split, identified as "Comparison Sample," show the tester's identity, and be forwarded to the Regional Materials Laboratory accompanied by the field test results.

All testing equipment involved will be examined for the presence of the required Region verification tags current for the present calendar year. In addition, evaluation of the condition of the equipment items is advised for determination of in service wear or damage.

9-5.5B(4) Evaluation of Independent Assurance Samples Testing

The companion tests of Independent Assurance Samples will be performed employing another qualified operator and set of verified testing equipment than that used for the field (acceptance) test results. When acceptance testing is performed at the Regional Materials Laboratory, the operators should be under the same degree of Independent Assurance oversight as for acceptance sampling performed in the field.

9-5.5B(5) Comparison of Independent Assurance and Acceptance Test Results

Independent Assurance results or comparison results will be compared with the acceptance results. Reports of the comparison of results will be provided to the Project Engineer and the Region IAI. Comments reflecting the degree of conformance will be entered in the remarks section of the report by the Regional Materials Engineer. The degree of conformance will be determined according to the deviation ranges noted below. Gradation test results will be compared only on specification screens.

Test	Normal Range of Deviation	Maximum Range of Deviation
Sand Equivalent	± 8 points	± 15 points
Fracture	± 5 percent	± 10 percent
Asphalt Content (ACP&ATB)	± 0.3 percent	± 0.6 percent
Sieve Analysis — All Items:		
No. 4 (4.75 mm) sieve and larger	± 5 percent	± 8 percent
No. 6 (3.35 mm) sieve to No. 80 (0.180 mm) sieve	± 3 percent	± 6 percent
No. 100 (0.150 mm) sieve to No. 200 (0.075 mm) sieve	± 2 percent	± 4 percent

In the table above, "Normal Range" indicates an acceptable range of variation between test results and no action is required. Test results that fall in this category will be so indicated by the wording *"normal deviation"* on the independent assurance test reports.

Test results falling outside of the "Normal Range" but within the "Maximum Range," will be indicated by the wording *"questionable deviation"* on the independent assurance test reports. For deviations falling into this category, the Project Engineer or a representative shall review the original test report form, advise the responsible test operator of the deviation, and review the test procedure at the next opportunity. The IAI will take the same actions relative to the test operator in the region laboratory.

Test results exceeding the maximum range will be indicated by the wording *"excessive deviation."* For deviations falling in the excessive category, the Project Engineer or a representative will notify the IAI and/or Region Construction Trainer for their services in corrective action. Corrective action involving both the field tester and the region laboratory tester will include review of sampling procedures, sample splitting procedures, testing procedures, and testing equipment.

The Project Engineer will document actions and results of these investigations by a notation or attachment to the independent assurance sample test report. The Independent Assurance Inspector shall document the actions and results of these investigations on the individual's checklist evaluation with notations as to his/her findings in reviewing region lab procedures. Lacking any other actions, these results shall be considered in scheduling repeat evaluations of a tester and entered into the individual's qualification record. These may include comments or findings by the Region Construction Trainer.

The focus of Independent Assurance sampling is based on individual tester's activity and is not intended to provide independent assurance sample reports on all projects or on all materials on any particular project.

9-5.6 Tolerance Limits

Crushed Coverstone

English	Metric	Specification Limits	Tolerance Limits
% Passing 3/4″	% Passing 19.0 mm	100	95-100
% Passing 5/8″	% Passing 16.0 mm	95-100	90-100
% Passing No. 4	% Passing 4.75 mm	20-45	16-49
% Passing No. 200	% Passing 0.075 mm	0-7.5	0-9.0
Sand Equivalent	Sand Equivalent	32 Min.	27 Min.
Fracture	Fracture	75% Min.	70% Min.

Crushed Screenings 3/4″ — 1/2″ (19.0 mm — 12.5 mm) for B.S.T.

English	Metric	Specification Limits	Tolerance Limits
% Passing 1″	% Passing 25.0 mm	100	95-100
% Passing 3/4″	% Passing 19.0 mm	95-100	90-100
% Passing 1/2″	% Passing 12.5 mm	0-20	0-25
% Passing 3/8″	% Passing 9.50 mm	0-5	0-10
% Passing No. 200	% Passing 0.075 mm	0-1.0	0-2.0
Fracture	Fracture	75% Min.	70% Min.

Crushed Screenings 5/8″ — No. 4 (16.0 mm — 4.75 mm) or B.S.T.

English	Metric	Specification Limits	Tolerance Limits
% Passing 3/4″	% Passing 19.0 mm	100	95-100
% Passing 5/8″	% Passing 16.0 mm	95-100	90-100
% Passing No. 4	% Passing 4.75 mm	0-10	0-15
% Passing No. 10	% Passing 2.00 mm	0-3	0-7
% Passing No. 200	% Passing 0.075 mm	0-1.0	0-2.0
Fracture	Fracture	75% Min.	70% min.

Crushed Screenings 1/2″ — No. 4 (12.5 mm — 4.75 mm) or B.S.T.

English	Metric	Specification Limits	Tolerance Limits
% Passing 5/8″	% Passing 16.0 mm	100	95-100
% Passing 1/2″	% Passing 12.5 mm	95-100	90-100
% Passing No. 4	% Passing 4.75 mm	0-15	0-20
% Passing No. 10	% Passing 2.00 mm	0-3	0-7
% Passing No. 200	% Passing 0.075 mm	0-1.0	0-2.0
Fracture	Fracture	75% Min.	70% Min

Crushed Screening 3/8″ — No. 10 (9. 50 mm — 2.00 mm)

English	Metric	Specification Limits	Tolerance Limits
% Passing 1/2″	% Passing 12.5 mm	100	95-100
% Passing 3/8″	% Passing 9.50 mm	90-100	85-100
% Passing No. 4	% Passing 4.75	30-56	25-61
% Passing No. 10	% Passing 2.00 mm	0-10	0-12
% Passing No. 200	% Passing 0.075 mm	0-1.0	0-2.0
Fracture	Fracture	75% Min.	70% Min.

Crushed Screenings No. 4 — 0″ (4.75 mm — 0 mm) for B.S.T.

English	Metric	Specification Limits	Tolerance Limits
% Passing 3/8″	% Passing 9.50 mm	100	95-100
% Passing No. 4	% Passing 4.75 mm	76-100	71-100
% Passing No. 10	% Passing 2.00 mm	30-60	26-64
% Passing No. 200	% Passing 0.075 mm	0-10.0	0-11.0
Fracture	Fracture	75% Min.	70% Min.

Ballast

English	Metric	Specification Limits	Tolerance Limits
% Passing 2 1/2″	% Passing 63 mm	100	100
% Passing 2″	% Passing 50.0 mm	65-100	60-100
% Passing 1″	% Passing 25.0 mm	50-85	45-90
% Passing No. 4	% Passing 4.75 mm	26-44	21-49
% Passing No. 40	% Passing 0.425 mm	16 Max.	20 Max.
% Passing No. 200	% Passing 0.075 mm	9.0 Max.	10.0 Max.
Sand Equivalent	Sand Equivalent	27 Min.	22 Min.
Dust Ratio	Dust Ratio	2/3 Max.	

Shoulder Ballast

English	Metric	Specification Limits	Tolerance Limits
% Passing 2 1/2″	% Passing 63 mm	100	100
% Passing 2″	% Passing 50.0 mm	65-100	60-100
% Passing 3/4″	% Passing 19.0 mm	40-80	35-85
% Passing No. 4	% Passing 4.75 mm	0-5	0-6
% Passing No. 100	% Passing 0.150 mm	0-2.0	0-2.9
Fracture	Fracture	75% Min.	70% Min.

Crushed Surfacing Base Course

English	Metric	Specification Limits	Tolerance Limits
% Passing 1 1/4″	% Passing 31.5 mm	100	95-100
% Passing 1″	% Passing 25.0 mm	80-100	75-100
% Passing 5/8″	% Passing 16.0 mm	50-80	45-85
% Passing No. 4	% Passing 4.75 mm	25-45	20-50
% Passing No. 40	% Passing 0.425 mm	3-18	3-20
% Passing No. 200	% Passing 0.075 mm	7.5 Max.	9.0 Max.
Sand Equivalent	Sand Equivalent	32 Min.	27 Min.
Fracture	Fracture	75% Min.	70% Min.

Crushed Surfacing Top Course

English	Metric	Specification Limits	Tolerance Limits
% Passing 3/4″	% Passing 19.0 mm	100	95-100
% Passing 1/2″	% Passing 12.5 mm	80-100	75-100
% Passing No. 4	% Passing 4.75 mm	46-66	41-71
% Passing No. 40	% Passing 0.425 mm	8-24	5-27
% Passing No. 200	% Passing 0.075 mm	10.0 Max.	11.0 Max.
Sand Equivalent	Sand Equivalent	32 Min.	27 Min.
Fracture	Fracture	75% Min.	70% Min.

Maintenance Rock

English	Metric	Specification Limits	Tolerance Limits
% Passing 5/8″	% Passing 16.0 mm	100	95-100
% Passing 1/2″	% Passing 12.5 mm	90-100	85-100
% Passing No. 4	% Passing 4.75 mm	45-66	40-71
% Passing No. 40	% Passing 0.425 mm	10-25	8-30
% Passing No. 200	% Passing 0.075 mm	7.0 Max.	8.0 Max.
Sand Equivalent	Sand Equivalent	32 Min.	27 Min.
Fracture	Fracture	75% Min.	70% Min.

Gravel Base

English	Metric	Specification Limits	Tolerance Limits
% Passing 2″	% Passing 50.0 mm	75-100	70-100
% Passing No. 4	% Passing 4.75 mm	22-100	17-100
% Passing No. 200	% Passing 0.075 mm	10.0 Max.	11.0 Max.
Sand Equivalent	Sand Equivalent	27 Min.	22 Min.
Dust Ratio	Dust Ratio	2/3 Max.	

Gravel Backfill for Walls

English	Metric	Specification Limits	Tolerance Limits
% Passing 4″	% Passing 100 mm	100	100
% Passing 2″	% Passing 50.0 mm	75-100	70-100
% Passing No. 4	% Passing 4.75 mm	22-66	17-71
% Passing No. 200	% Passing 0.075 mm	5.0 Max.	6.0 Max.
Sand Equivalent	Sand Equivalent	52 Min.	47 Min.
Dust Ratio	Dust Ratio	2/3 Max.	

Gravel Backfill for Pipe Zone Bedding

English	Metric	Specification Limits	Tolerance Limits
% Passing 1 1/2″	% Passing 37.5 mm	100	100
% Passing 1″	% Passing 25.0 mm	75-100	70-100
% Passing 5/8″	% Passing 16.0 mm	50-100	45-100
% Passing No. 4	% Passing 4.75 mm	20-80	15-85
% Passing No. 40	% Passing 0.425 mm	3-24	2-29
% Passing No. 200	% Passing 0.075 mm	10.0 Max.	11.0 Max.
Sand Equivalent	Sand Equivalent	27 Min.	22 Min.

Gravel Backfill for Drains

English	Metric	Specification Limits	Tolerance Limits
% Passing 1″	% Passing 25.0 mm	100	95-100
% Passing 3/4″	% Passing 19.0 mm	80-100	75-100
% Passing 3/8″	% Passing 9.50 mm	10-40	8-45
% Passing No. 4	% Passing 4.75 mm	0-4	0-5
% Passing No. 200	% Passing 0.075 mm	0-2	0-2.5

Gravel Backfill for Drywells

English	Metric Limits	Specification Limits	Tolerance
% Passing 1 1/2″	% Passing 37.5 mm	100	95-100
% Passing 1″	% Passing 25.0 mm	80-100	75-100
% Passing 3/4″	% Passing 19.0 mm	0-20	0-25
% Passing 3/8″	% Passing 9.50 mm	0-2	0-3
% Passing No. 200	% Passing 0.075 mm	0-1.5	0-2.0

Backfill for Sand Drains

English	Metric	Specification Limits	Tolerance Limits
% Passing 1/2″	% Passing 12.5 mm	90-100	85-100
% Passing No. 4	% Passing 4.75 mm	57-100	52-100
% Passing No. 10	% Passing 2.00 mm	40-100	35-100
% Passing No. 50	% Passing 0.30 mm	3-30	2-35
% Passing No. 100	% Passing 0.150 mm	0-4	0-5
% Passing No. 200	% Passing 0.075 mm	0-3.0	0-3.9

Sand Drainage Blanket

English	Metric	Specification Limits	Tolerance Limits
% Passing 2 1/2″	% Passing 63 mm	90-100	85-100
% Passing No. 4	% Passing 4.75 mm	24-100	18-100
% Passing No. 10	% Passing 2.00 mm	14-100	9-100
% Passing No. 50	% Passing 0.30 mm	0-30	0-35
% Passing No. 100	% Passing 0.150 mm	0-7	0-8
% Passing No. 200	% Passing 0.075 mm	0-3.0	0-3.9

Gravel Borrow

English	Metric	Specification Limits	Tolerance Limits
% Passing 4″	% Passing 100 mm	100	95-100
% Passing 2″	% Passing 50.0 mm	75-100	70-100
% Passing No. 4	% Passing 4.75 mm	50-80	45-85
% Passing No. 40	% Passing 0.425 mm	30 Max.	33 Max.
% Passing No. 200	% Passing 0.075 mm	7.0 Max.	9.0 Max.
Sand Equivalent	Sand Equivalent	42 Min.	37 Min.

Select Borrow

English	Metric	Specification Limits	Tolerance Limits
% Passing 6″	% Passing 150 mm	100	95-100
% Passing 3″	% Passing 75.0 mm	75-100	70-100
% Passing No. 40	% Passing 0.425 mm	50 Max.	55 Max.
% Passing No. 200	% Passing 0.075 mm	10.0 Max.	12.0 Max.
Sand Equivalent	Sand Equivalent	22 Min.	19 Min.

Foundation Material Class A

English	Metric Limits	Specification Limits	Tolerance
% Passing 2 1/2″	% Passing 63 mm	98-100	93-100
% Passing 2″	% Passing 50.0 mm	92-100	87-100
% Passing 1 1/2″	% Passing 37.5 mm	72-87	67-92
% Passing 1 1/4″	% Passing 31.5 mm	58-75	53-80
% Passing 3/4″	% Passing 19.0 mm	27-47	22-52
% Passing 3/8″	% Passing 9.50 mm	3-14	2-16
% Passing No. 4	% Passing 4.75 mm	0-1	0-2

Foundation Material Class B

English	Metric	Specification Limits	Tolerance Limits
% Passing 2 1/2″	% Passing 63 mm	95-100	90-100
% Passing 2″	% Passing 50.0 mm	75-100	70-100
% Passing 1 1/2″	% Passing 37.5 mm	30-60	25-65
% Passing 1 1/4″	% Passing 31.5 mm	0-15	0-17
% Passing 3/4″	% Passing 19.0 mm	0-1	0-2

Asphalt Materials — Paving Asphalt

English/Metric	Specification Limits	Tolerance Limits
Performance Grade (PG)	AASHTO M320	+ 10% of spec

9-5.7 Acceptance Sampling and Testing Frequency Guide

Item	Test	English Acceptance Sample	Metric Acceptance Sample
Gravel Borrow	Grading & SE	1 – 4000 Ton	4000 Tonnes
Select Borrow	Grading & SE	1 – 4000 Ton	4000 Tonnes
Sand Drainage Blanket	Grading	1 – 4000 Ton	4000 Tonnes
Gravel Base	Grading, SE & Dust Ratio	1 – 4000 Ton	4000 Tonnes
CSTC	Grading, SE & Fracture	1 – 2000 Ton	2000 Tonnes
CSBC	Grading, SE & Fracture	1 – 2000 Ton	2000 Tonnes
Maintenance Rock	Grading, SE & Fracture	1 – 2000 Ton	2000 Tonnes
Ballast	Grading, SE & Dust Ratio	1 – 2000 Ton	2000 Tonnes
Shoulder Ballast	Grading & Fracture	1 – 2000 Ton	2000 Tonnes
Backfill for Sand Drains	Grading	1 – 2000 Ton	2000 Tonnes
Crushed Covers e	Grading, SE & Fracture	1 – 1000 Ton	1000 Tonnes
Crushed Screening			
5/8 – No. 4 (16.0 – 4.75 mm)	Grading & Fracture	1 – 1000 Ton	1000 Tonnes
1/2 – No. 4 (12.0 – 4.75 mm)	Grading & Fracture	1 – 1000 Ton	1000 Tonnes
No. 4 – 0 (4.75 – 0 mm)	Grading & Fracture	1 – 1000 Ton	1000 Tonnes
Gravel Backfill For			
Foundations	Grading & SE	1 – 1000 Ton	1000 Tonnes
Walls	Grading, SE & Dust Ratio	1 – 1000 Ton	1000 Tonnes
Pipe Zone Bedding	Grading & SE	1 – 1000 Ton	1000 Tonnes
Drains	Grading	1 – 100 Ton	100 Tonnes
PCC Paving			
Coarse Aggregate	Grading	1 – 2000 Ton	2000 Tonnes
Fine Aggregate	Grading	1 – 2000 Ton	2000 Tonnes
Air Content	Air	1 – 500 CY	400 m3
Cylinders (28-day)	Compressive Strength	1 – 500 CY	400 m3
Core	Density	1 – 500 CY	400 m3
	Thickness	1 – 500 CY	400 m3
Cement See Note 5	Chemical & Physical Certification		
PCC Structures			
Coarse Aggregate	Grading	1 – 1000 Ton	1000 Tonnes
Fine Aggregate	Grading	1 – 1000 Ton	1000 Tonnes
Consistency	Slump	1 – 50 CY	40 m^3
Air Content	Air	1 – 50 CY	40 m^3
Cylinders (28-day)	Compressive Strength	1 – 50 CY	40 m^3
Cement See Note 5	Chemical & Physical Certification		
Asphalt Concrete Pavement			
Completed Mix, See Note 3 and 4			
	Grading & Asphalt Content	1 – 800 Ton	800 Tonnes
	Compaction	5 – 400 Ton	400 Tonnes
Open Graded, See Note 3 Class D and D Mod.	Grading (Agg. from cold feed)	1 – 800 Ton	800 Tonnes